2 Sheets—Sheet 1.

H. A. & W. M. HOLMES.

Grain-Binder.

No. 210,533. **Patented Dec. 3, 1878.**

Fig. 1

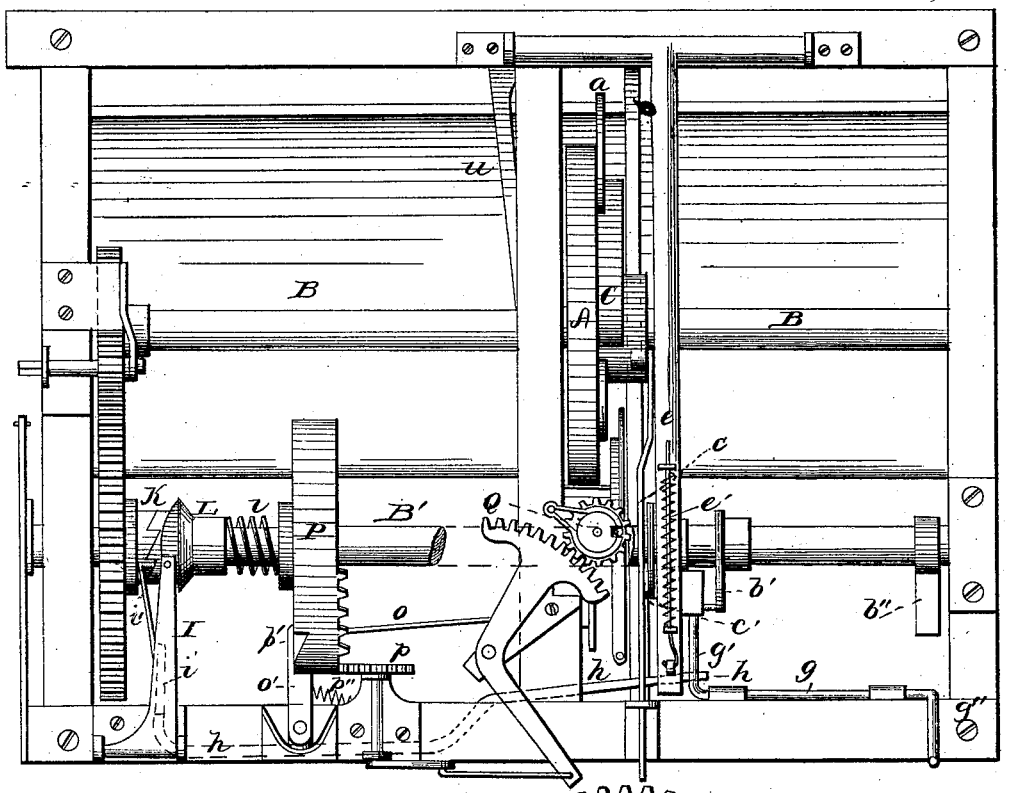
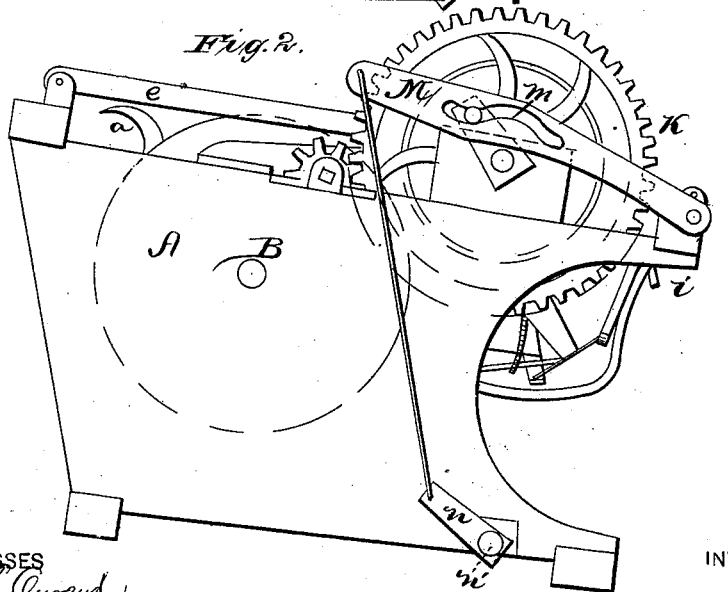


Fig. 2.



WITNESSES

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2 Sheets—Sheet 2.

H. A. & W. M. HOLMES.

Grain-Binder.

No. 210,533. **Patented Dec. 3, 1878.**

Fig. 3.

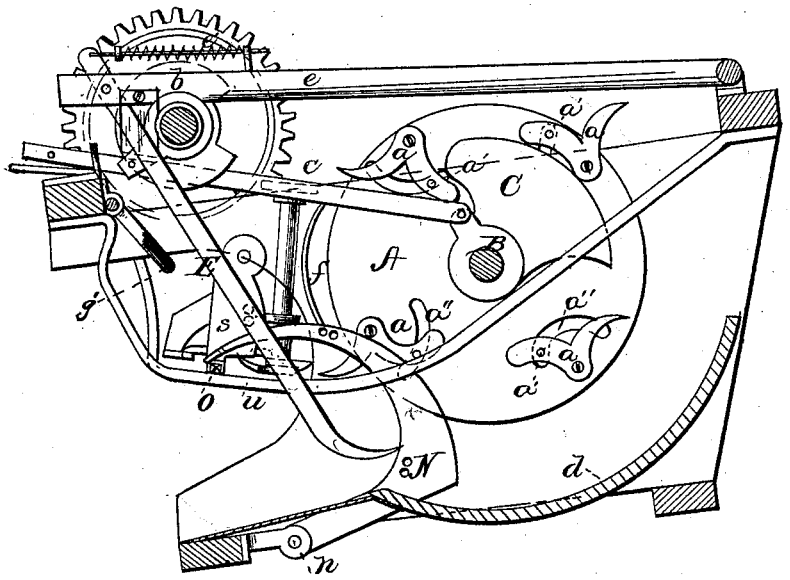


Fig. 5.

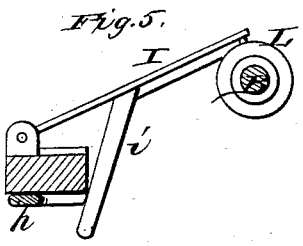
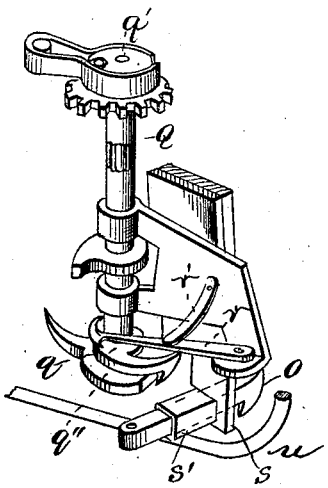


Fig. 4.



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UNITED STATES PATENT OFFICE.

HECTOR A. HOLMES AND WATSON M. HOLMES, OF OWATONNA, MINNESOTA.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **210,533**, dated December 3, 1878; application filed February 8, 1878.

To all whom it may concern:

Be it known that we, HECTOR A. HOLMES and WATSON M. HOLMES, of Owatonna, in the county of Steele and State of Minnesota, have invented certain new and useful Improvements in Grain-Binders, of which the following is a specification:

Figure 1 is a top-plan view of the binder. Fig. 2 is a side elevation. Fig. 3 is a side elevation of the opposite end of the machine, partly in section. Fig. 4 is a perspective view, showing the tying mechanism. Fig. 5 is a detail, showing the shipper.

This invention presents certain improvements in grain-binders; and these relate, chiefly, to the device used for packing or collecting the grain as it comes from the harvester into bundles, and in the means employed for compressing the grain for the purpose of binding it, and in the mechanism for operating this compressor, and in a shipping device which shall automatically and at intervals throw certain parts of the mechanism into and out of gear, and in the means for grasping and cutting, also the means for tying, the disengaging hook, and in the general and particular details of the construction and operation of this machine, all as will now be more in detail set out and explained.

In the accompanying drawings, A is a wheel near the center of the machine, and fixed on and revolved by shaft B on the side of this wheel, and as near as may be to the edge, are pivoted the packers *a*. In the revolution of the wheel the inner arms of the packers *a* (in each of which is a pin, *a'*, which acts as a stop, and prevents the said packers turning too far either way to be operated upon by the cam C, loosely mounted on the shaft B) will be caught by the upper edge of the said cam C, and this will cause the hooked ends of said packers to project outward, and in their progress over the curved floor *d* they will gather and convey the grain forward toward and against the compressor E. The continued revolutions of the wheel A will cause the said inner arms of packers *a* to pass the lower edge of cam C, and in so doing be free to turn upon their pivots, and their hooked ends allowed to pass over and by the accumulating grain, and thus in turn each of the packers will be so moved on their pivots and pass over the grain till their inner ends again strike against the upper edge of the said cam C.

When the packers have accumulated sufficient grain over the needle-arm to form a bundle, the grain will have pushed the compressor E (which at its upper end is pivoted in the end of bar *c*, and this in turn at its opposite end is pivoted or hinged in the rear of the frame of the machine) forward until it impinges upon the arm *g'* of the compressing-lever *g*, and this arm then moves the trip-lever *h*. The opposite end of said lever, acting on the arm *i* of the shipper I, releases the shipper from its position between the driving-gear K and the clutch L, and then the spring *l* will cause these parts to match together, and the motion which carries the shaft B, being, by suitable cogs, imparted to the shaft B', will compel the binding mechanism to operate. To the end of the compressor E, where it projects above the bar *c*, is attached the spiral spring *c'*, to keep said compressor bearing against the approaching grain, and to throw the lower end of said compressor backward over the bundle after it is bound and the hinged compressor has been raised.

The lever M, pivoted at one end to the frame, and having a cam motion by means of the pin which works in the semi-elliptical groove *m*, will impart motion to the arm *n* of the shaft *n'*, beneath the floor of the machine, which carries the curved needle-arm N. This arm N will now be brought up and around the bundle of grain, the wire or cord passing through its eye, and loops be carried over the bundle of grain, so that when the needle has passed the grasper O the bundle will be certainly encircled with the wire or cord. The disk *b*, having notch or slot in its periphery, acts on the shoulder *c'* of the arm or bar *c*, which is connected at one end to the side of cam C in such a manner as to prevent the packers *a* pushing the grain forward while the shoulder *c'* is sliding over the periphery of the said disk *b* aforesaid, and until it has fallen into the slot in said disk, and until the needle-arm has resumed its position beneath the floor of the machine, when the cam C is carried backward and downward by the motion of the said shaft B, and the wheel and packers in this

position cause the grain to again be brought forward for another bundle. Motion is imparted to the tying parts by means of the intermittent gear-wheel P, which is mounted on shaft B′. Its gear meshes with gear-wheel *p*, and, by suitable arms and links, communicates motion to the pinion at the head of the hollow shaft Q, which has at its lower end the hook *q*, and in the shaft Q is a shaft, *q′*, taking motion from Q by means of its cap, through which a pin from the pinion passes, and having at its lower end a curved projecting arm, *q″*, with an arm extending out from its inner end. This arm *q″* fits immediately and closely under hook *q*.

The disengaging-hook *r* is held against the other parts of the tier by means of spring *r′*. The grasper O takes its motion from the intermittent gear-wheel P, against the rim of which, on the side opposite the gear-teeth, the arm *o′* of elbow or lever *o* presses, and which falls, on the revolution of P at the proper time, into a slot, *p′*, in the said rim. At this moment the spring *p″* draws the elbow *o* forward, and this allows the rod connecting with the grasper to be drawn forward, and thus the grasper, which, at its head is carried in a sleeve, *s′*, attached to the lower end of the swinging plate *s*, is projected forward, said plate allowing desired freedom of motion.

The continued revolution of P serves to draw the arm *o′* back upon the rim of P, and this draws back the grasper O.

The outer end of arm or lever *o* is suitably secured to the frame, so that the lever end will have its proper motion, as aforesaid.

Upon the shaft B′, at the end opposite the wheel P, are the crank-arms *b′ b″*. The office of the former is to raise the compressor E above the bundle, (and thus admit of its lower end being forced backward over the bundle by the spiral spring *c′*, as aforesaid,) and this is done by its moving under, and its lug or pin engaging upon, the plate on the bar *e*, and when the said pin, in its continued revolutions, has passed off the flange upon said plate, the compressor E will drop between the bound bundle and the succeeding gavel. The other crank-arm, *b″*, which is placed near the end of the shaft, is designed to engage upon the arm *g″* of the compressing-lever *g*, and thus cause the lug upon the opposite arm *g′* to engage upon the compressor E, and force the said compressor against the bundle just previous to and while the knot is being tied, and thus cause the bundle to be more compact.

The arms or braces *n* will not only serve to strengthen the machine, but will keep the grain from the mechanism, and will more certainly define its path.

We will now explain the manner of operation. Place the end of the cord in the grasper. As the needle moves backward it carries the cord over the tier. When a bundle has accumulated, the needle comes up, encircling the bundle, and places the other part of the cord upon the tier, and comes to rest while the knot is being tied. The tier now revolves to the left. The guide on lower piece of the tier passes over the cord in the grasper and needle, bears then downward, and forms a loop around the tier. The tier revolves until the hook receives the cord, when it moves in opposite direction and grasps the cord firmly. At this instant the grasper releases the end of the cord and grasps and severs the other. The tier continues to move backward, and the discharging-hook draws off the tier and over the ends of the cord, and the knot is formed.

Having thus described our invention, what we consider new, and desire to secure by Letters Patent, is—

1. In a binder, the wheel A, with packers *a*, in combination with cam C, arm *c*, and disk *b*, substantially as and for the purposes set forth.

2. The hinged compressor E *e*, adapted to be operated by spring *e′* and crank-arm *b′*, substantially as and for the purposes set forth.

3. The combination of crank-arm *b″* with arm *g″* of the trip *g*, operating shipper I, substantially as and for the purposes set forth.

4. The combination of compressor-arm E, hinged to movable arm *e*, and adapted to be operated by spring *e′*, with arm *g′*, trip-lever *h*, shipper I, gear K, and clutch L, substantially as described.

5. The hollow shaft Q, with its hooked end *q*, and internal shaft, *q′*, with its curved end *q″*, operated as described, and combined with hook *r*, substantially as described.

6. The combination, with the wheel P, having a segmental rack on one side, for operating the tying mechanism, and a cam-surface on the other side, to operate the cord-grasper, of a shipper which throws in and out of operation at intervals, substantially as described.

7. In combination with grasper O, hook *r*, and spring *r′*, the hollow shaft Q, having hooked end *q*, and internal shaft, *q′*, with its curved end *q″*, substantially in the manner and for the purposes set forth.

8. The grasper O, moving in hinged sleeve *s′*, attached to the vertical grasping-plate *s*, and operated by gear-wheel P and spring *p″*, and combined with needle N, substantially as set forth.

In testimony that we claim the foregoing as our own invention we have affixed our signatures in presence of two witnesses.

HECTOR A. HOLMES.
WATSON M. HOLMES.

Witnesses:
THOS. M. GRANT,
W. C. HADLEY.